Prototype of DAAT (Decision Analysis Aid Tool); An Aid to Medical Decision Making Over the World Wide Web

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This program represents a prototype for a medical decision making tool on the World Wide Web (WWW). The Decision Analysis Aid Tool (DAAT) was designed to serve as a means for access to repositories of information about medical tests, a support device for physicians who are looking for up-to-date information regarding the specificity and sensitivity of tests for a given disease state, and an instructional aid for medical students. The ultimate goal is to provide a mechanism for the generation and support of medical decision trees that are both referenced to literature sources and flexible with regard to input data and outcome predictions.

As the use of the WWW proliferates, we believe it provides an excellent opportunity for education and utilization in the health care profession. DAAT is designed to be both an educational and functional tool for the practicing physician, residents-in-training, and medical students. As a functional implementation and demonstration of medical decision analysis, Bayesian mechanics, and Web capability in this area, we hope to demonstrate some of the potential that current Web authoring techniques have to offer in the field of Medical Informatics. This design is an example of the types of tools that can be created by the implementation of database access over the WWW.

The current technology afforded by the Common Gateway Interface (CGI) allows for the maintenance and evolution of robust relational databases through a Web interface. In addition, CGI can provide interaction with the user that allows for the definition and creation of program output based on specific user input of decision node values and tests. The DAAT provides the tools with which to search for information about medical tests, and a graphical interface enabling the design of medical decision trees and evaluation using user-defined variables.

Using a commercially available Web Server and Microsoft Access for Windows 95, we created a web-accessible relational database containing the specificity and sensitivity for common medical tests linked to their values based on presumed disease states. This allowed for Web-based queries of the database to return information of user-defined interest. The returned matches to the user query for information about a specific disease reveals a list of tests that can give information about the probability of the disease being present. When a test is then selected by the user, the specificity and sensitivity of that test for the disease is returned, along with graphical tools for the construction of a decision tree through a separate CGI program. This program evaluates the tree constructed by the user and return values for outcomes.

By combining the hypertext environment with a decision tree structure, this representation provides an accessible interface to current information on medical tests. In addition, the flexible nature of the tree structure in combination with concurrent Bayesian analysis of outcomes provides a unique tool for medical personnel in the evaluation of the decision making process. In implementing this project using the Web and CGI, there exists the opportunity for user-defined manipulations of the decision tree structure that are unique to the format of the tool. The flexibility of the programming environment will allow us to alter or enhance the user interface in response to the ongoing evaluation of the program.

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